IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

MANFRED HEISLER ET AL.

Group Art Unit: 1723

Examiner: David L. Sorkin

Serial No.: 10/802,455

Filed: March 17, 2004

For: PROCESS FOR THE CONTINUOUS PREPARATION OF HIGH-VISCOSITY SILICONE COMPOSITIONS

Attorney Docket No.: WAS 0627 PUS

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief - Patents
Commissioner for Patents
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief from the final rejection of claims 1 - 17 of the Office Action mailed on October 24, 2006 for the above-identified patent application.

I. REAL PARTY IN INTEREST

The real party in interest is Wacker Chemie AG("Assignee"), a corporation organized and existing under the laws of Germany, and having a place of business at Hanns-Seidel-Platz 4, Munich, Germany 81737, as set forth in the assignment recorded in the U.S. Patent and Trademark Office on March 17, 2004, Reel 015114/Frame 0132.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to the Appellant, the Appellant's legal representative, or the Assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1 - 17 are pending in this application. Claims 1 - 17 have been rejected and are the subject of this appeal.

IV. STATUS OF AMENDMENTS

An amendment after final rejection was filed on January 19, 2007 and has been denied entry.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter is directed to a process for preparing organopolysiloxane compositions having:

A process for preparing organopolysiloxane compositions (A) having a viscosity measured at 25°C of at least 500 Pa·s., comprising mixing and kneading organopolysiloxanes (O) and fillers (F) in a first process stage in a kneading cascade having at least two kneading chambers which are arranged in series adjacent one another, each containing two kneading tools having parallel axes and capable of being driven in co-rotating or counter-rotating directions, said chambers connected to one another by means of openings through which material passes in a direction transverse to the axes of the kneading tools, at least the first kneading chamber having a feed opening and the last kneading chamber having a discharge opening, to provide a raw organopolysiloxane mixture, and, in a second process stage, kneading and degassing the raw mixture in a reciprocating kneader. Claim 1 as filed; specification, page 3, lines 2 - 12.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The claims have been rejected under 35 U.S.C. § 103(a) over Mathur et al. U.S. published application 2003/0229175 (hereinafter , "*Mathur*") in view of Schuster et al. U.S. patent 5,854,343 (hereinafter, "*Schuster*").

VII. ARGUMENT

1. With Respect to All Claims.

The subject invention is directed to an improvement in the compounding of filled high viscosity silicone rubber compositions. Prior to Appellants' invention, such compositions had been prepared by blending filler with high viscosity organopolysiloxanes in a batch type continuous mixer followed by a reciprocating compounder (U.S. 4,737,561); by a twin screw extruder (AU-A-91 76 256); or by a cascade of kneaders (*Schuster*).

Schuster indicates (column 1, lines 12 - 45), that the use of reciprocating components and twin screw extruders do not provide the residence time or the thorough mixing required.[1] In particular, it is well known in the art that incorporation of filler into high viscosity organopolysiloxanes is difficult, particularly so if the fillers are not pre-hydrophobicized. This is because all common fillers are hydrophilic as prepared, while organopolysiloxanes are quite hydrophobic. These problems are considerably exacerbated when gums are used to prepare highly viscous products, due to the even lower wetting abilities of the gum-like raw materials.

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[1] From a technological standpoint, *Schuster* is really directed to preparation of liquid silicone rubber (LSR) which employs lower viscosity organopolysiloxanes to begin with, the filled compositions being liquid or putty-like. The problems associated with filler addition in such compositions are much less severe than in high viscosity silicone rubber (HTV).

Schuster teaches avoiding the use of twin screw extruders and reciprocating kneaders by employing instead, a kneading cascade of a plurality of kneaders having parallel mixing blades and facility to transport product from one chamber to the next in a direction transverse to the kneading axis, as shown in his Figure 1. The kneading chambers do not require the addition of inert gas, since they are operated in a filled condition, and thus there is no gas entrained in the product.[2] Volatiles are removed following the cascade in a devolatization vessel purged with nitrogen and operating at low pressure (200 mbar). *Schuster*, column 7, lines 6 - 15.

In his comparative examples (Example 2), *Schuster* employed a twin screw extruder with an evacuation zone to remove gases and volatiles, and thereby obtained a product containing nodules (unsatisfactory) and having unacceptable storage stability. Despite being produced from the same ingredients as in Example 1, the target viscosity of 1100 - 1500 Pa·s could not be obtained. Instead, a product of considerably higher viscosity (1800 Pa·s) was produced. It is clear to one skilled in the art, viewing *Schuster*, that reciprocating kneaders and twin screw extruders are to be avoided in order to prepare filled high viscosity silicone rubbers which are free from lumps, have acceptable viscosity, and exhibit satisfactory storage stability.

Mathur was filed long after the publication of *Schuster* (*Schuster* was first published in late 1997), on February 27, 2003, as a continuation-in-part of an earlier application filed on December 21, 1999. The continuation-in-part application contains significant additional disclosure, and the parent application does not disclose the process on which the Office has based the rejection. Despite the publication of *Schuster* more than two years earlier than the *Mathur* parent application, and almost 5 years prior to the *Mathur* CIP, *Mathur* does not teach or suggest any process employing a kneading cascade. Rather, in

[2] Thus, there is no reason to employ a reciprocating kneader to remove gas inclusions.

Example 1, *Mathur* employs a Henschel mixer (a batch-type mixer, as is well known), followed by adding the premix formed in the Henschel mixer into a dough mixer for further compounding; and in Example 2, employed a co-rotating intermeshing twin screw extruder (exactly what *Schuster* avoids), followed by a single shaft reciprocating extruder. Thus, in the six years since the *Schuster* publication, those skilled in the art failed to modify the *Schuster* process as the Office has proposed.

a. No Motivation to Combine.

The claims have been rejected under 35 U.S.C. § 103(a) over *Mathur* in view of *Schuster*. Appellants, as presented earlier during prosecution, find no evidence of any motivation which would encourage one skilled in the art to combine these references.

Combination of references has been addressed by the Federal Circuit numerous times. In the case of *In re Anita Dembiczak* and *Benson Zinbarg*, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999), the CAFC has indicated that the requirement for showing the teaching or motivation to combine references is "rigorous." *Dembiczak* at 1617. Moreover, this showing, which is rigorously required, must be "clear and particular." *Dembiczak* at 1617. See also, *C.R. Bard v. M3 Sys., Inc.*, 48 U.S.P.Q.2d 1225, 1232 (Fed. Cir. 1998). It is well established that merely because references <u>can</u> be combined, the mere suitability for logical combination does <u>not</u> provide <u>motivation</u> for the combination. See, *Berghauser v. Dann, Comr. Pats.*, 204 U.S.P.Q. 398 (DCDC 1979); *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 U.S.P.Q. 929 (Fed. Cir. 1984). Moreover, mere conclusory statements supporting the proposed combination, standing alone are not "evidence". *McElmurry v. Arkansas Power & Light Co.*, 27 U.S.P.Q.2d 1129, 1131 (Fed. Cir. 1993). *See also, In re Lee*, 61 U.S.P.Q. 2d 1430 (Fed. Cir. 2002).

In the Final Office Action of October 24, 2006, the Office states that the motivation to combine *Mathur* with *Schuster* is "because both references involve continuous processes for preparing organopolysiloxane compositions mixed with filler." However, this is at most a conclusory statement, is irrelevant to the issue, and is insufficient as a matter of law. Moreover, and most importantly, the references themselves teach against the proposed combination.

Merely because references are in a similar technological field does not supply evidence of motivation to combine. While it is true that both references are directed to incorporating filler into organopolysiloxanes, this is where the similarity stops. For example, at column 2, lines 33 - 38, *Mathur* indicates that the filler used in his process must be one with silanol surface groups, i.e. hydrophilic silica fillers. *Schuster*, on the other hand, is directed exclusively to the use of pre-hydrophobicized fillers. As is so well established in the art as to require judicial notice, the problems encountered in mixing hydrophilic fillers as opposed to hydrophobic fillers are completely different, and both different processes are generally required as well as different mixing apparatus. One skilled in the art would not look to *Mathur* to find any solution to a problem of *Schuster*, and *vice versa*.

Second, *Schuster* teaches exactly against the proposed combination. *Schuster* clearly and unambiguously states that twin screw extruders and reciprocating kneaders are unsatisfactory, and gives reasons why they should be avoided. He even prepared a comparative example showing that such mixing apparatus does not provide an acceptable product.

Thus, there is no evidence supporting the combination. Merely because references could be combined does not provide evidence supporting their combination. *Berghauser, id.; ACS Hospital Systems, Id.* There is certainly no evidence which rises to the "clear and particular" mandate of *Dembiczak* and its progeny.

Moreover, here, the references are not even capable of physical combination. *Schuster* is directed to a process where pre-hydrophobicized fillers are required. *Mathur* is directed to a process where hydrophilic fillers are required. Each of these limitations are salient features of the respective references. It is well established that when combinations of references are contemplated, bits and pieces cannot be taken from one reference and combined with another while disregarding other required and salient features. *In re Wesslau*, 353 F.2d 238, 147 USPQ 391, (CCPA 1965). Here, the combination is not possible, as it would require either ignoring *Schuster's* requirement for pre-hydrophobicized filler or *Mathur's* requirement of hydrophilic filler, both of which are salient features of the respective references. Combination would also require one skilled in the art to completely ignore *Schuster's* teaching that twin screw and reciprocating mixers be avoided. How can the combination ignore this teaching? Reversal of the rejections over *Mathur* in view of *Schuster* is solicited for this reason; there is not motivation to combine, rather the reverse.

b. Even Were Combination Proper, the Claims are Non-obvious.

Even were there evidence of motivation to combine the references, the combination does not teach or suggest the claimed invention, because *Schuster* teaches against the use of a reciprocating kneader, which is required by the claimed invention. Teaching away is strong evidence of non-obviousness. *W.L. Gore v. Garlock*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983).

As Appellants have indicated by their Examples and Comparative Examples, the claimed process prepares filled silicone rubbers with advantageous properties otherwise unobtainable. In the subject invention examples, Comparative Example C1 is taken directly from the kneading cascade, as taught by *Schuster*. Comparative Example 3 was prepared in a reciprocating kneader, with a 16:50 recycle back to the kneader first stage. Comparative Example 4 was also prepared in a reciprocating kneader, without recycle. The subject

invention example (Example 2) had only 0.5% volatiles as compared with 1.3 to 1.9% for rubbers prepared by the comparative processes. Note that not even recycle lowers the volatiles content; rather, it increased slightly. The subject invention composition also exhibited low coloration after cure, while the coloration of all comparative examples was considerably worse.

2. Separately with Regard to Claim 13.

Claim 13 requires the filler to be pre-hydrophobicized, consistent with the teachings of *Schuster*. However, *Mathur* requires that his filler be a hydrophilic filler, still containing surface silanol groups (which hydrophobing eliminates). Thus, *Mathur* teaches directly away from the subject matter of claim 13.

In summary, there is no motivation to combine *Mathur* with *Schuster,* much less the clear and particular evidence required under the existing law. Moreover, even were combination possible, *arguendo*, the combination does not teach or suggest the invention, as *Schuster* teaches away from doing as Appellants have done.

The fee of $500.00 as applicable under the provisions of 37 C.F.R. § 41.20(b)(2) is being transmitted electronically herewith. Please charge any additional fee or credit any overpayment in connection with this filing to our Deposit Account No. 02-3978.

Respectfully submitted,

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Enclosure - Appendices

VIII. CLAIMS APPENDIX

1. A process for preparing organopolysiloxane compositions (A) having a viscosity measured at 25°C of at least 500 Pa·s., comprising mixing and kneading organopolysiloxanes (O) and fillers (F) in a first process stage in a kneading cascade having at least two kneading chambers which are arranged in series adjacent one another, each containing two kneading tools having parallel axes and capable of being driven in co-rotating or counter-rotating directions, said chambers connected to one another by means of openings through which material passes in a direction transverse to the axes of the kneading tools, at least the first kneading chamber having a feed opening and the last kneading chamber having a discharge opening, to provide a raw organopolysiloxane mixture, and, in a second process stage, kneading and degassing the raw mixture in a reciprocating kneader.

2. The process of claim 1, wherein the kneading cascade comprises from 3 to 10 kneading chambers.

3. The process of claim 1, wherein the kneading tools of the kneading cascade comprise one or more of kneading blades, rollers, or polygonal plates.

4. The process of claim 2, wherein the kneading tools of the kneading cascade comprise one or more of kneading blades, rollers, or polygonal plates.

5. The process of claim 1, wherein the temperature of the mixture along the reciprocating kneader is regulated by means of orifice plates whose flow-reducing action can be adjusted from the outside without opening the kneader.

6. The process of claim 2, wherein the temperature of the mixture along the reciprocating kneader is regulated by means of orifice plates whose flow-reducing action can be adjusted from the outside without opening the kneader.

7. The process of claim 3, wherein the temperature of the mixture along the reciprocating kneader is regulated by means of orifice plates whose flow-reducing action can be adjusted from the outside without opening the kneader.

8. The process of claim 1, wherein the filler content of the organopolysiloxane compositions (A) is from 5 to 80% by weight.

9. The process of claim 1, wherein silicas having a specific surface area determined by the BET method of at least 50 m^2/g are used as fillers (F).

10. The process of claim 1, wherein polydimethylsiloxanes of the formula (3)

$$(ViMe_2SiO_{1/2})_c\ (ViMeSiO)_d\ (Me_2SiO)_e\ (Me_3SiO_{1/2})_f \quad (3)$$

where Vi is a vinyl radical and Me is a methyl radical, and the non-negative integers c, d, e and f obey the following relationships: $c+d \geq 1$, $c+f = 2$, $1000 < (d+e) < 9000$, and $0 < (d+1) / (d+e) < 1$, are used as organopolysiloxanes (O).

11. The process of claim 1, wherein polydimethylsiloxanes of the formula (3)

$$(ViMe_2SiO_{1/2})_c\ (ViMeSiO)_d\ (Me_2SiO)_e\ (Me_3SiO_{1/2})_f \quad (3)$$

where Vi is a vinyl radical and Me is a methyl radical, and the non-negative integers c, d, e and f obey the following relationships: $c+d \geq 1$, $c+f = 2$, $3000 < (d+e) < 7000$, and $0 < (d+1) / (d+e) < 0.1$, are used as organopolysiloxanes (O).

12. The process of claim 1, wherein organopolysiloxanes having a viscosity measured at 25°C of from 10 to 200 mPa·s are added as structure improvers (S).

13. The process of claim 1, wherein said filler is a prehydrophobicized filler.

14. The process of claim 1, wherein in both said kneading cascade and said reciprocating kneader, the composition is maintained at a temperature of 280°C or less.

15. The process of claim 1, wherein organopolysiloxane, untreated filler and hydrophobicizing agent are added to chamber(s) of the kneading cascade.

16. The process of claim 1, wherein organopolysiloxane untreated filler, and structure improver are added to chamber(s) of the kneading cascade.

17. The process of claim 16, wherein no structure improver is added to a last chamber of the kneading cascade.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.